Section 104 CONTROL OF THE WORK

104.01 Authority of Department. All approvals, reviews, and inspections of any nature by the Department, its officers, agents, and employees, shall not be construed as a warranty or assumption of liability on the part of the Department. It is expressly understood and agreed that any approvals are for the sole and exclusive purposes of the Department, which is acting in a governmental capacity under this contract. Any approvals, reviews, and inspections by the Department will not relieve the Contractor of the Contractor's obligations under the contract, nor are such approvals, reviews, and inspections by the Department to be construed as a warranty as to the propriety of the Contractor's performance, but are undertaken for the sole use and information of the Department.

A. **General Authority of the Engineer.** The Engineer will decide all questions which may arise as to the interpretation of the plans and specifications, and all questions as to the satisfactory and acceptable fulfillment of the terms of the contract by the Contractor. The Engineer will also decide all questions which may arise as to the quality and acceptability of materials furnished, work performed, manner of performance, and rate of progress of the work.

   The Engineer will clarify and decide as to the true intent of the plans and specifications when an inconsistency, omission, conflict or uncertainty is discovered.

B. **Authority of the Engineer to Suspend Work.** The Engineer will have authority to suspend the work wholly or in part, for period(s) deemed necessary. Work may be suspended due to unsuitable weather or such other conditions as are considered unfavorable for the prosecution of the work or for any other condition or reason deemed to be in the interest of the public. The Contractor shall not suspend work without written approval from the Engineer except in the case of a safety issue at which time, the Engineer must be notified with specific details.

   Upon suspension, the work shall be put in satisfactory condition, covered and protected. The work shall not be resumed until permitted by written order of the Engineer.

   If the performance of all or any portion of the work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for the adjustment.

   Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost or time required for the performance of the contract has increased as a result of the suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or Subcontractors at any approved tier, and the suspension was not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the contract in writing. The Contractor will be notified of the Engineer's determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

C. **Authority and Duties of Inspectors.** Inspectors may be appointed to inspect materials used and work done. Inspection may extend to all parts of the work and preparation or manufacture of materials for use in the work. Inspectors are not authorized to revoke or change the specifications or plans. If a dispute arises between the Contractor and the Inspector as to the materials furnished or performance of the work, the Inspector shall have the authority to reject materials or suspend the work until the dispute is decided by the Engineer. Work done contrary to the Inspector's directions or while suspended by the Inspector will be considered unauthorized and may have to be removed and replaced at the Contractor's expense according to subsection 104.05. In no instance will any action or omission on the part of the Inspector relieve the Contractor of the responsibility of completing the work according to the plans and specifications.

D. **Authority to Inspect.** The Department and its authorized representatives shall have access to all parts of the work at all times and shall be furnished such information and assistance by the Contractor as may be required to make a complete and detailed inspection. This inspection may also occur at a mill, plant, laboratory, or shop. Claims by the Contractor for reasonable delays or inconvenience due to these operations will not be considered.

E. **Authority to Inspect Scales.** The Department maintains the right to inspect or check all scale systems, private scale inspectors, and inspection agencies. Any failure to conform to requirements set forth in this specification shall be corrected immediately.

For portable scales, the Contractor will, at the Contractor's own expense, secure a scale check from a local official sealer of weights and measures, or the Engineer may give tentative approval, based on check truckloads weighed on other scales that bear an official seal placed in the current calendar year.

Scale systems, other than as described in subsection 601.03, shall be inspected according to the current edition of the National Institute of Standards and Technology *NIST Handbook 44* or as otherwise provided by law. Scale systems described in subsection 601.03 shall be inspected according to the current edition of the National Ready Mixed Concrete Association (NRMCA) *Certification of Ready Mixed Concrete Production Facilities Quality Control Manual.*

Permanent scale systems are defined as weighing devices that have not been moved from a given location within the past 6 months. Portable scales that remain in one location for more than 6 months are considered permanent installations. The owner of any permanent scale system shall be responsible for the scheduling of inspection, calibration, and working order of the weighing system.

For permanent scale systems, the Department will consider scale inspections conducted by a private scale inspection agency or the Department of Agriculture valid for one year, except for concrete plants which will be according to Subsections 601.03.A and B. If the Department of Agriculture has not reinspected the scale, the scale owner shall be required to obtain a scale inspection through a private scale inspection agency. The scale owner

shall provide to the Engineer written verification that the scale system has been inspected according to this specification prior to providing material to state and federally funded projects. The Scale owner shall furnish a copy of the current scale inspection report to the District Materials Supervisor.

The private scale inspection agency shall be experienced in the inspections and required to have the following minimum equipment:

Platform Scales - Twenty 100 pound weights
Hopper Scales - Ten 1000 pound weights and twenty 50 pound weights

All costs incurred in the inspection of scale systems shall be the responsibility of the Contractor and no additional compensation shall be allowed. Claims by the Contractor for reasonable delays and inconveniences due to these operations will not be considered.

104.02 Plans and Working Drawings. The Department will furnish construction plans showing details of necessary work. Dimensions which are omitted from the contract drawings and needed to complete the work will be furnished by the Engineer. The Contractor shall be responsible for all dimensions scaled from the contract drawings.

The Contractor shall submit for review all shop plans or working drawings not furnished by the Department for all parts of the finished structure or roadway.

At cofferdam locations where the depth of retained water is less than or equal to 6 feet, the Contractor shall submit for review, working drawings for all cofferdams which are not part of the finished structure. The cofferdam shall be designed by an engineer competent in the field. The Contractor shall be fully responsible for the correctness of such drawings and for making certain that they are in compliance with permit requirements.

At cofferdam locations where the depth of retained water is greater than 6 feet, the Contractor shall submit for review, working drawings and design calculations for all cofferdams which are not part of the finished structure. The cofferdam design shall be sealed by a Professional Engineer licensed in Michigan. The Contractor shall be fully responsible for the correctness of such drawings and for making certain that they are in compliance with permit requirements.

The Contractor may be required to submit for review, working drawings and design calculations for falsework and forms which are not part of the finished structure. When not required in the plans, but requested by the Engineer, the work of submitting working drawings and design calculations for falsework and forms which are not part of the finished structure will be paid for as extra work. Working drawings and design calculations submitted for falsework and forms which are not part of the finished structure, shall be sealed by a Professional Engineer licensed in Michigan. The Contractor shall be fully responsible for the correctness of such drawings and for making certain that they are in compliance with permit requirements.

The Contractor shall furnish the Engineer with as many copies of the shop plans or working drawings as needed for review and distribution. The Department will require a reasonable time for review and acceptance.

The Department review and acceptance shall not relieve the Contractor of full responsibility for all negligence in the construction of the project resulting from the shop plans and working drawings. Review by the Department of the shop plans and working drawings is not to be construed as a warranty of the adequacy and correctness of the design.

The Contractor shall make arrangements to permit the Department to deal directly with the fabricator or supplier in reviewing the detail final working drawings for the following or similar items:

A. Fabricated Structural Elements;

B. Mechanical Equipment;

C. Electrical Equipment and Circuitry; and

D. Water Mains.

On existing structures, the exposed features shall be checked by the Contractor before starting construction to see that its relationship to the proposed work is as shown on the plans. Any differences requiring changes in the new work shall immediately be reported to the Engineer. If the changes are of sufficient magnitude, time extensions will be considered. The cost of checking existing structure dimensions will not be paid for separately, but will be included in payment for Mobilization, listed in section 150. Increased or decreased quantities will be paid for at the contract unit prices as if there had been no discrepancies in the plans.

Upon completion of the work, the Contractor shall furnish the Department one complete set of shop plans on polyester film. Copies of catalogue cuts, parts lists, operating procedures, and instructions, as necessary for the project, shall be furnished by the Contractor, when requested.

104.03 Deviations from the Plans. Deviations from the plans for the work or from working drawings, will not be permitted without the written order of the Engineer.

When the Engineer authorizes Contractor proposed deviations from the plans or working drawings, the Contractor shall submit for review revised plans or working drawings. Revised plans, working drawings, and all supporting design calculations submitted for these authorized deviations shall be sealed by a Professional Engineer licensed in Michigan. The Contractor shall be fully responsible for the correctness of such plans and drawings and for making certain that they are in compliance with permit requirements.

104.04 Conformity with Plans and Specifications. All work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans or required by the specifications.

In the event the Engineer finds the materials, work performed, or the finished product not within reasonably close conformity with the plans and specifications, the Engineer will then determine if the work is to be accepted or rejected. If the work is to be accepted, the Engineer will document the basis of acceptance by contract modification which will provide for an appropriate adjustment in the contract price, or a guaranty bond, as deemed necessary to conform to the Engineer's

determination based on engineering judgment except where adjustments are shown elsewhere in these specifications.

In the event the Engineer rejects the work, it shall be removed and replaced or otherwise corrected by and at the expense of the Contractor.

104.05 Removal of Unauthorized Work. Work done without the required inspection or all extra work done without authority may be considered unauthorized and may be ordered removed or replaced at the Contractor's expense.

104.06 Coordination of Specifications and Plans. In case of discrepancy, dimensions provided in the plans shall govern over calculated dimensions. Calculated dimensions shall govern over scaled dimensions. The following parts of the contract will prevail over all other parts in the following order:

A. All proposal material except those listed below in B - F

B. Special Provisions

C. Supplemental Specifications

D. Project Plans and Drawings

E. Standard Plans

F. Standard Specifications

The Contractor shall not take advantage of any apparent error or omission in the contract documents. If any uncertainty, inconsistency, omission, or conflict is discovered in the contract documents, the Engineer will decide as to the true intent.

104.07 Cooperation by the Contractor. The Contractor shall conduct the operations so as to cooperate with and interfere as little as possible with activities of other Contractors, utilities, or any public authority on or near the work, and as directed by the Engineer. The Department may perform other work and permit public utility companies and others to do work on or near the project. Except as stated in subsection 109.03, no additional compensation will be paid to the Contractor for reasonable delay or inconvenience due to the following:

A. Material shortages;

B. The operations of or encountering other parties doing the work required by the contract; or

C. The encountering of existing utilities shown on the plans.

The Contractor shall designate a competent Project Supervisor authorized to act as agent and be responsible for all Subcontractors. The Project Supervisor shall be designated by name prior to commencement of the work and shall be available for proper management of the project.

Unless approved by the Engineer, the Contractor shall, at all times, have a competent Project Supervisor authorized to act for the Contractor as agent on the project site, who thoroughly understands the plans and specifications.

The Contractor shall furnish each Subcontractor, Project Supervisor, Superintendent, and Foreman with a copy of that part of the plans and specifications pertaining to the work being performed. These plans and specifications shall be kept at the work site at all times.

The Contractor and all Subcontractors shall permit the Department access to their books, records, accounts, other sources of information, and the Contractor's facilities as may be determined by the Department to be necessary to ascertain compliance with the contract.

104.08 Lines, Grades, and Elevations. The Contractor will be responsible for furnishing, placing, protecting, and maintaining staking necessary for proper prosecution, inspection and final measurements of the work under the contract. The Contractor will be responsible for determination and layout of detail dimensions and elevations. The Engineer may check the Contractor's work at any time to assure conformance per section 104.01.

A. **Engineer Staking.** The Engineer will establish the original horizontal and vertical control points, if necessary, prior to construction as follows:

   1. On road projects, stakes will be set on construction centerline or an offset line approximately every 1,000 feet on tangent and at all points of curvature, tangent deflections and spiral control. Furnished benchmarks as shown on the plans and temporary benchmarks as necessary to establish points at approximately every 1,000 feet along the project will be looped and accurately set by the Engineer.

   2. On bridge projects, a staked layout or a base line will be provided so the structure can be staked radially. The method used will be discussed with the Contractor prior to doing the layout. The stakeout will include witnesses and two benchmarks. A stakeout diagram showing witnesses, angles, and coordinates will be provided to the Contractor.

   3. Points of intersection of curves and spirals, may be eliminated when they fall beyond the right of way limits.

   4. The Engineer will provide the Contractor a list of coordinates for the control points and benchmarks when applicable.

   5. Right of way staking shall be the responsibility of the Engineer. If required, for the installation of right of way fence or to delineate right of way, a right of way stake will be set at a maximum of 100-foot intervals along the right of way line and at all corners marking a change in width or direction.

B. **Contractor Staking.** The Contractor shall supply all stakes, survey equipment, personnel, and other devices necessary for checking, marking, preserving, and maintaining all points, lines, and grades as defined in the MDOT Construction Manual. Stakes will be set and marked in a manner that will permit checking of the construction activities. All work shall be done in such a manner as to allow the proper verification of all related work and pay

items. Staking shall not be done in such a manner as to preclude the Engineer from exercising the authority specified under section 104.01. The Contractor shall notify the Engineer, two working days prior to moving any benchmark or control point, and shall provide the Engineer a list of points moved, including but not limited to computations and descriptions of the new locations.

The Contractor shall use competent personnel and suitable equipment and materials for layout work required. The Contractor shall submit, for the Engineer's approval, a resume documenting the crew chief's ability, experience, and education. Grade stakes of the following nominal minimum dimensions are to be furnished by the Contractor. Grade stakes are to be 1 inch by 2 inch by 3 feet, light colored hardwood; slope stakes are to be 1 inch by 4 inch by 2 feet, light colored hardwood; pavement stakes are to be 1 inch by 4 inch by 3 feet, light colored hardwood. All stakes are to be planed on both sides.

The Contractor will be responsible for the development of all necessary grades and field notes, from data supplied on the plans. These grades will be provided to the Engineer after they are computed and at least 48 hours prior to the start of the related work or as requested by the Engineer. Printouts of profile grades shown on the plans may be available upon the Contractor's request. Other information related to the development of the grades may also be available. The Contractor must be aware that this information may not be complete or accurate and shall not be used as a basis for any claim relating to plan errors and omissions. In addition, the Contractor shall provide and be responsible for the following:

1. **Control Points.** Witnessing horizontal control points (such as curvature points, tangent deflections, and spiral controls) for reestablishment within 0.02 feet for line and distance. The measured distance between control points shall check with a precision of 1 in 5,000 for road work and 1 in 10,000 for bridge work. At least three witnesses for each control point, each visible from the other, shall be maintained during construction.

2. **Benchmarks.** A level circuit shall be run over the entire project to check plan benchmarks and establish new benchmarks. Benchmarks shall be looped with a minimum of three benchmarks in the loop and shall check within 0.01 feet. When grading, the Contractor shall check into a benchmark, within 0.03 feet, at 1,000-foot intervals. The Engineer shall be advised of any bench elevation correction made due to out of tolerance checks. A minimum of two benchmarks shall be maintained at each structure during construction.

3. **Slope Stakes, Subgrade Stakes, Undercut Stakes, Clearing Stakes.** Stakes shall be provided at 50-foot intervals or as agreed to by the Engineer, and at all break points due to subgrade transitions. This includes, but is not limited to, superelevation transitions and ramp transitions. The Engineer may request subgrade stakes after topsoil stripping for subgrade inspection prior to commencement of subsequent grading operations. Individual tree removal shall be marked and determined by the Engineer.

4. **Pavement Stakes.** After the subbase is placed and rough graded, pavement stakes shall be provided as follows:

a. Stakes will be placed at 50-foot intervals on tangent sections and on curves with radii of 1,150 feet or more.

b. Stakes will be placed at 25-foot intervals on curves with radii of less than 1,150 feet.

c. In addition to yield stakes, the Contractor is also required to set an adequate number of stakes to determine bituminous wedging limits. This may include taking cross sections in questionable areas as determined by the Engineer.

The pavement grade stakes will be used for finish grading of the subbase, base course, and pavement. They will be checked for grade, realigned, and tacked prior to the paving operation. Offsets required for the Contractor's operations shall be determined by the Contractor and approved by the Engineer.

5. **Drainage Stakes.** Grade and location stakes for culverts, sanitary sewers, storm sewers, subsurface drains, drainage structures, sanitary structures, and outlets shall be provided by the Contractor. The Contractor shall be responsible for positive drainage. Adjustments in location and grade for drainage items shall be approved by the Engineer. Prior to installation of underdrains, the Contractor shall submit, to the Engineer for approval, a plan for underdrain outlets which includes distance between outlets, low point of vertical curves and comparison between clay grade , the underdrain grade , the outlet grade and the ditch grade at each outlet location.

6. **Miscellaneous Staking.** Staking for pump houses, curb and gutter, sidewalk, watermains, retaining walls, siphons, sound walls, barrier walls, junction chambers, guardrail, sign structures, signs, structure under clearance, crossovers, restoration items, erosion control items and all staking not addressed, but required to construct the project in accordance with the contract documents or to determine pay quantities, shall be the responsibility of the Contractor.

7. **Utility Staking.** The Contractor shall provide proposed bridge and roadway location grades and layout of contract work for the utility company's use in relocation of their facilities within the project right-of-way, after the contract has been awarded.

8. **Muck Stakes.** Muck stakes shall be provided as follows or as modified by the Engineer:

   a. Centerline stakes will be placed in accordance with subsection 104.08.B.4.a and b.

   b. Offset stakes at no more than 50-foot intervals shall be placed in order to provide adequate information for the construction and for determination of pay quantities.

   c. Each stake shall clearly display the stationing, offset distance, and ground elevation.

   d. When the depths of the replaced muck needs to be determined by the Engineer, the Contractor shall establish a grid as directed by the Engineer to determine the amount of peat excavation. The normal grid is one cross section every 50-foot along the centerline between the 1:1 slope intercept with the original ground as defined in the applicable standard plans for the treatment of peat marshes.

9. **Temporary Signs.** All temporary sign stakes or markings in accordance with the project plans and maintaining traffic provisions in the proposal shall be the responsibility of the Contractor. The Contractor shall notify the Engineer after this work is completed but prior to the temporary sign installation.

10. **Bridge Approaches.** The Contractor shall be responsible for the development of all grades and field notes necessary to construct the bridge approaches from data supplied on the plans.

11. **Bridge Substructure.** Upon completion of excavation for the foundation, the Engineer will verify line and grade of the foundation.

    The Contractor shall be responsible for carrying line and grade to the bridge seat elevation, aligning and dimensioning of forms, and staking of substructure work (i.e., footing embankment or excavation, pile layout, footings, abutment wall, anchor bolts, etc.).

    Prior to casting of the pier cap or abutment wall, the Engineer will verify the line, grade, and span lengths. Any costs for adjustments due to the Contractor's work methods shall be the Contractor's responsibility.

12. **Bridge Superstructure.** Deck and rail grades, screed, haunch, bulkhead, sidewalk, curb, fascia, barrier grades, and any other grade required to complete the structure shall be set by the Contractor. The Contractor shall determine beam elevations and/or existing deck elevations to compute final deck grades, including those for overlay projects. The final deck grades and their associated calculations shall be provided to the Engineer prior to setting the rail grades. If the Contractor must adjust the screed to obtain proper slab depth, steel cover, ride quality, drainage, or cosmetic appearance, approval must be obtained from the Engineer. All other bridge superstructure grades that require adjustment shall be provided to the Engineer prior to their use. Any staking cost incurred due to these adjustments shall be the responsibility of the Contractor. Other changes initiated by the Department will be paid for as extra work.

    Whenever there is new construction or improvements of existing roadway or structure the Contractor shall furnish the Engineer structure clearance measurements as outlined in the Construction Manual.

13. **Bridge Overlays.** On overlay projects, proposed finished deck grades referenced to a proposed deck profile shall be determined by the Contractor and approved by the Engineer prior to setting expansion joint devices. Expansion joint grades shall be set along the center line of the expansion joint device in accordance with the proposed deck cross section to achieve a quality ride across the deck. The proposed profile at all break points across the bridge deck section and at 25-foot intervals maximum shall be based on elevations taken on the existing concrete deck. If the existing deck is overlayed with bituminous, the existing elevations shall be taken after the bituminous overlay has been removed. Unless otherwise shown on the plans, the proposed deck cross slopes shall match the existing deck cross slopes.

The Contractor shall correct irregularities in existing profile cross section and slope using sound engineering judgement in order to achieve ride quality and drainage while maintaining proper cross slope. The Contractor shall consider depths of scarifying, depths of hydro-demolishing, and minimum thickness of overlay material in determining proposed bridge deck elevations. Proposed deck elevations shall be determined in a manner which will avoid overlay material quantity overruns. The quantity of overlay material required to construct the deck to the proposed elevations shall be calculated by the Contractor and submitted to the Engineer with the proposed deck elevations prior to construction.

14. **Urban Staking** - When the pay item Contractor Staking, Urban is included in the Contract, the Contractor is hereby notified that all field conditions may not have been incorporated into the plans that would allow an accurate fit of the proposed work. Therefore, it is expected that the Contractor shall exercise proper engineering judgement and develop the grades and notes, after performing the necessary checks at the proposed project site. If deviations from the plans occur, the Contractor shall immediately notify the Engineer and propose a potential solution. The Engineer shall determine the actual solution and give direction to the Contractor as soon as possible. The cost to perform the above mentioned work shall be included in the item Contractor Staking, Urban.

15. **Final Measurement.** Final measurement for payment, will be the responsibility of the Contractor and will include detailed measurements, sketches and computations. Measurements will be in accordance with the pay items as specified.

C. **Construction Survey and Staking Measurements.** Construction survey and staking tolerances shall be as outlined in Table 104-1.

Table 104-1 Construction Survey and Staking Measurements

	Horizontal feet (min)	**Vertical** feet (min)
Bench loops	1000 ft. between benchmarks	0.01 ft. between benchmarks
ROW Stakes	0.01 (Angles turned to the nearest 5 sec)	
Clearing Stakes	0.10	N/A
Slope Stakes	0.10	0.10
Subgrade, Utility Tunnel, and Misc Stakes	0.10	0.01
Pavement, Drainage and Bridge Stakes	0.01	0.01
Cross Sections	25 feet left and right; 50 feet along centerline	0.10 on ground shots 0.01 on hard surfaces

D. **Preserving Stakes.** Completed staking shall be preserved as long as required for inspection of construction work by the Engineer. Any inspection or checking of the Contractor's layout by the Engineer and the acceptance of all or any part of it shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades, and elevations of the several parts of the work.

If the stakes or benchmarks are lost or destroyed, they will be replaced by the Contractor and verified by the Engineer. No payment for any related contract pay item will be made until the above lost or destroyed stakes are replaced by the Contractor. No claims for damages during this time period will be allowed.

Stakes set by the Engineer shall be carefully preserved by the Contractor. Any stakes destroyed due to the Contractor's operations will be replaced at the Engineer's earliest convenience and the Contractor will be charged for the labor, equipment and materials required to replace the stakes.

All government monuments within the project limits will be located, preserved, and witnessed unless specified otherwise. Any monuments destroyed due to the Contractor's operations or negligence will be reestablished by a registered land surveyor hired by the Contractor at no cost to the Department. The replacement shall be completed as soon as practicable. If the surveying is not completed, the Engineer will hire a registered land surveyor to complete the work. All costs will be charged to the Contractor. All remonumenting shall be according to Act 74, P.A.1970 as amended and Act 345, P.A. 1990 as amended.

E. **Plan Errors.** A plan error shall be defined as any omission, miscalculation, or inaccurate dimension which occurs on the plans that cannot be corrected to fit the existing conditions or the proposed project with prudent and judicious use of applied engineering knowledge by an experienced staking crew in the normal performance of its duties. The Contractor shall document the efforts made and the steps taken to correct any plan discrepancy when it occurs. This documentation shall be submitted to the Engineer when requested.

   If a plan error is discovered, then all of the following shall occur. The Contractor shall immediately notify the Engineer of any plan error. The Engineer will determine the solution (MDOT or Contractor - proposed) to the plan error as soon as possible. The Engineer will then decide as soon as possible whether the Contractor or the Department will provide the staking for the corrective action.

   If the plan error results in extra work to the contract, the Engineer shall issue a work order directing the corrective action. The time paid to the Contractor for staking shall begin when the crew begins the work detailed on the work order, including time for calculations and plotting if such work is required by the work order. The Contractor is responsible for written notification to the Engineer as to when such work begins and ends.

F. **Extra Work.** For extra work, the Engineer will provide any necessary grades and/or computations. The Engineer will then determine who is to perform the required staking. If the Contractor is to perform the staking, payment shall be in accordance with subsection 109.07.

G. **Changes.** Staking changes approved by the Engineer due to the Contractor's methods will not be paid for separately. The Engineer will have two working days to resolve and approve all staking changes. No claims for damages or extensions of time during this period will be allowed unless it can be shown that the claim adversely affects the critical operation and were outside the approved Contractor Quality Control Plan.

The Contractor shall provide documentation for all staking changes initiated by the Contractor, including those resulting from plan error, for approval of the Engineer prior to staking. This may include, but is not limited to, all notes, computations, and drawings necessary to determine the changes. When staking, the Contractor shall perform the necessary checks to establish the proper location and grade to fit the existing conditions as agreed to with the Engineer. Any errors resulting from the operations of the Contractor shall be corrected at no additional cost to the Department.

H. **Staking Documentation.** Staking documentation and field notes shall be signed, checked, dated, and provided by the Contractor in a neat and orderly manner as approved by the Engineer prior to the start of the related work. The original field notes and grade computation documents shall become the property of the Department upon completion of the work. The field notes and computation documents may be inspected by the Department at any time.

The Contractor shall provide original and final plotted cross sections and final volume calculations in a format meeting the prior approval of the Engineer for all earthwork, undercuts, muck excavation, swamp backfill, sand subbase, and topsoil stripping and shall determine final quantities for these items by plan sheet breakdown. Intermediate plotted cross sections will be provided by the Contractor to verify interim earthwork quantities when requested by the Department. The Contractor shall also provide to the Engineer a final "as constructed" full sized set of paper plans documenting all changes of vertical and horizontal alignment, all drainage and subsurface changes, and other miscellaneous changes. All plans and cross sections shall be at the same scale provided the Contractor on the plans.

I. **Contractor Staking Quality Control.** Contractor Staking Quality Control shall be the means by which the Contractor ensures that the construction staking on the project complies with the requirements of the contract. The controls shall be adequate to cover all staking operations including that done by subcontractors and shall be keyed to the construction sequence.

As a minimum, all staking on this project shall be done in accordance with the Construction Surveying Guidelines provided in the MDOT Construction Manual or an alternate guidebook as approved by the Engineer.

At the preconstruction meeting the Contractor shall provide the Engineer with a Contractor Staking Quality Control (CSQC) plan for this project detailing the guidebook used for quality control and all measures incorporated to detect and minimize construction staking errors and problems.

Periodic review of the CSQC plan shall be done by the Engineer and Contractor during the life of the contract. The Engineer shall be allowed access to all construction staking work in progress and all phases of the ongoing CSQC plan for the purpose of assurance review. Assurance reviews will be used for the purpose of making independent checks on the reliability of the Contractor’s quality control procedures as outline in the CSQC plan. These checks are not to be construed as a basis for acceptance of any work by the Contractor. The Contractor remains solely responsible for the correction of any inadequate work related to Contractor staking errors.

The CSQC plan shall include, as a minimum, the following information to cover all aspects of staking operations under control of the Contractor.

1. **Plan Manager.** Identify one person as the sole contact to the Department relating to staking quality control. This person shall be responsible for contractor staking quality control on all phases of the project and shall be on site during all staking operations.

2. **Equipment Calibration.** Provide copies of all equipment certification. This shall include, but is not limited to, levels, transits, lasers, total stations and GPS units. Equipment will be checked on a semi-annual basis or at anytime accuracy becomes questionable. Tests are to be made on a certified stand when possible. When field checks are made, the method used and all readings are to be documented and provided to the Engineer.

3. **Procedures and records.** This section of the plan shall contain a listing of the procedures and records to be used to properly control the quality of the staking operations. This portion of the plan shall include as a minimum, the following:

   a. List of work items to be staked

   b. Description of the method of computing grades and staking

   c. Description of the checks made to detect errors while staking

   d. Method of documentation, example field book

   e. Procedure to handle detected errors

   f. Final Measurement method and documentation

4. **Approval of CSQC plan.** Acceptance of the CSQC plan is required prior to the start of staking operations. The Department has five work days to review the plan to determine acceptability. Work is not to start until the plan is accepted by the Engineer in writing. Delays due to the Contractor's inability to submit an acceptable plan shall not be a basis for extensions of time without liquidated damages.

5. **Changing the Plan** If it is determined by the Department, that the Contractor's performance on the project is unsatisfactory, the Department reserves the right to require the Contractor to make changes in the CSQC plan at no additional cost to the Department. The Contractor may be required to suspend all work operations until the plan is changed and approved.

J. **Method of Measurement and Basis of Payment:** Contractor Staking, as specified, will be paid for on a lump sum basis.

Partial payments for Contractor Staking will be made according to the following schedule:

Percent of Original Contract Amount Earned	Percent of Bid Price Paid
Approved CSQC Plan	10 %
10 %	30 %
50 %	75 %
90 %	90 %

The Department will retain ten percent of the bid amount for contractor staking until the Engineer receives all specified documents.

No adjustment in the lump sum amount will be made when final payment for the project is within ±5 percent of the original bid amount or for approved extensions of time. When final payment differs from the original bid amount by greater than 5 percent, an upward or downward adjustment will be made to the lump sum amount by the percentage which exceeds ±5 percent.

Staking plan errors or extras shall be paid for on an hourly basis.

Contract Item (Pay Item)	Pay Unit
Contractor Staking	Lump Sum
Contractor Staking, Bridge	Lump Sum
Contractor Staking, Urban	Lump Sum
Staking Plan Errors and Extras, One Person	Hour
Staking Plan Errors and Extras, Two Person	Hhour
Staking Plan Errors and Extras, Three Person	Hour

Maximum Cap on **Staking Plan Errors and Extras:** $75/hr. for one person; $100/hr. for two person; $125/hr. for three person.

If a price higher than the maximum stated is bid for **Staking Plan Errors and Extras, One Person; Staking Plan Errors and Extras, Two Person or Staking Plan Errors and Extras, Three Person**, the bid proposal will be deemed to have quoted the maximum and the bid total will be adjusted to reflect the maximum. If the bid is then the lowest accepted bid, and if the Contractor refuses to accept award of the contract, due to the change in the revised pay item amounts, the Contractor's proposal guaranty will be forfeited.

104.09 Disputed Claims for Extra Compensation. Any and all claims for extra compensation, whether on behalf of the Contractor or a Subcontractor, shall be signed and made directly by the Contractor. Failure of the Contractor to file a claim within the following time frames and according to both the Department's written claim procedures in effect at the time that the Contractor files the claim and the following process shall constitute a waiver of the claim regardless of whether it can be proven that the Department was prejudiced. When the Contractor claims extra compensation, which is disputed by the Engineer, the following process applies:

A. **Notice of Claim.** All notices of intent to file a claim for extra compensation shall be signed by the Contractor. If the Contractor intends to seek extra compensation for any reason not

specifically covered elsewhere in the contract, the time requirements for notification shall be as follows:

1. The Contractor shall notify the Engineer in writing before beginning the work or upon or encountering a circumstance on which the Contractor intends to base a claim.

2. The Contractor shall notify the Engineer in writing within two business days after the commencement of a delay, for which the Contractor intends to seek compensation.

Failure of the Contractor to give written notification will constitute a waiver of the claim for extra compensation except to the extent that claims are both substantiated by records created by the Department as to liability and amount, and are for extra costs that were unforeseeable. The determination of extra compensation made by the Department's claims process, where the Contractor has failed to give proper written notice of its claim for extra compensation as provided herein or has failed to afford the Engineer proper facilities for keeping strict account of actual costs, shall be final and binding on the Contractor.

Neither the refusal of the Contractor to sign a written contract modification or work order nor the Contractor's signing a contract modification or work order under protest shall constitute the notice required.

B. **Keeping Records.** If a Contractor files a notice of intent to file a claim, the Contractor shall keep accurate records of all costs of the work or delay and shall afford the Engineer every facility for keeping costs of the work or delay that is the subject matter of the claim. The Contractor and Engineer shall compare records and bring them into agreement at the end of each day.

C. **Validity of Claim.** The validity of a claim shall not be established either by the filing of a notice of intent to file a claim by a Contractor or the keeping of the cost records by the Engineer.

D. **Timing for Filing of Claim.** In addition to filing a timely notice of intent to file a claim, the Contractor shall file with the Engineer every claim for extra compensation within the following time frames (whichever comes first):

1. No later than 120 days after the work involved in the claim is completed, or the delay, loss of efficiency, loss of productivity, or similar event is terminated; or

2. No later than 60 days after the contract work is completed.

The Engineer may grant an extension of the above time frames to the Contractor, in writing, prior to the expiration of these time periods.

E. **Content of the Claim.** The Contractor's claim shall include:

1. All facts which gave rise to the claim;

2. A copy of the specific provisions of the contract which support the claim; and

3. When practical, the dollar amount of the claim with an explanation of how the amount was calculated.

The Engineer will review timely filed claims pursuant to the Department's written claim procedures in effect at the time the claims are filed.

104.10 Safety and Health Requirements. It shall be the Contractor's responsibility to protect the life and health of all personnel on the job, the safety and health of the public, and to protect property during construction of the projects. The Contractor shall comply with all federal, state, and local laws and regulations governing the construction methods and the furnishing and use of all safeguards, safety devices, protective equipment, and environmental and hazardous materials controls.

Prior to commencement of construction activities on the project, the Contractor shall provide the following:

1. **Safety Supervisor.** The Contractor shall provide written notification to the Engineer, the State Police and local law enforcement agencies of names, addresses and telephone numbers of the person and appointed alternate with the authority and responsibility to administer the accident and fire prevention program on the work to be performed under contract. This person will be known as the "Safety Supervisor." The alternate Safety Supervisor shall perform these functions in the absence of the Safety Supervisor. The persons designated shall be able to devote as much time as is necessary to administer the safety program.

2. **Construction Safety Program.** Prior to any on-site work, the Contractor shall submit, in writing, a "Construction Safety Program," outlining specifically the Contractor's plan for accident and fire prevention or mitigation on work to be done under contract, and for carrying out provisions of these specifications. This program shall also include provisions for meeting the requirements in subsection 812.03. The Contractor shall meet with the Engineer to discuss the Construction Safety Program and to develop mutual understandings to govern the administration and enforcement of the program.

3. **Emergency Control.** Either the Safety Supervisor or alternate shall be on call for notification of any emergencies that may arise during periods when construction operations are not in progress.

   The Safety Supervisor or alternate shall meet with the Engineer periodically as the work progresses to review the contract and the Construction Safety Program and consider modifications of these as may be required for the protection of traffic and prevention of accidents.

   If the Safety Supervisor or the alternate are not available to take protective or corrective measures, the Department will authorize others to do the work. The cost associated with such work will be the responsibility of the Contractor.

104.11 Limitations for Construction Equipment On or Crossing Pavements and Structures.

A. **General.** Permission for use of construction equipment on pavements and structures within project limits will be considered after:

1. Transverse expansion joints have been sawed and temporary or permanent seals placed;

2. Relief cuts have been made for transverse contraction and longitudinal joints;

3. Temporary or permanent seals have been placed in transverse contraction joints, if they have been sawed full width;

4. The transverse post tensioning of a bridge span has been completed;

5. The concrete has gained sufficient strength for the amount of load proposed to be placed thereon.

Construction equipment traveling on pavements shall not have tire loads exceeding 850 pounds per inch of nominal tire width.

No equipment that will damage the surface such as sheepsfoot rollers, paving equipment with flanged wheels, or track equipment will be permitted without adequate protective devices such as planks or timbers. The use of an earth cushion on a bridge structure will not be permitted.

Permission to use construction equipment on pavements and structures will not constitute a waiver of applicable provisions of subsection 107.11; nor waive the Contractor's legal responsibility to observe legal weight restrictions on sections of highway which have been accepted for traffic according to subsection 107.21.

Loads considered overweight are those having maximum gross axle loadings exceeding those permitted under Act 300, P.A. 1949 as amended. Legal load limits, as used herein, are considered those where a vehicle has axle loading in compliance with the provisions of this Act.

The strength of the concrete will be determined according to applicable methods specified in section 601.

B. **Construction Equipment Crossing Structures Which Have Not Attained 100 Percent of Anticipated Minimum Compressive Strength.** Requests to cross concrete bridges, grade separations, and box and slab culverts will be considered on the basis of gross vehicle load. The maximum gross vehicle load permitted will be dependent on the strength attained by the concrete as specified in Table 104-1. The maximum axle loadings shall not exceed the loadings permitted under Act 300, P.A. 1949 as amended, for the axle spacings indicated therein.

Table 104-2 Loads Permitted to Cross Structures asConcrete Gains Strength

Percent of Antici pated Minimum Compressive Strength	Flexural Strength (Modulus of Rupture)	Maximum Total Gross Vehicle Weight or Maximum Number of Axles Permitted (a)
60	550 psi	30,000 lbs
67	600 psi	37,500 lbs
75	650 psi	5 axles
80	650 psi	No Limit on Number of Axles
(a). Crawler-mounted equipment will be evaluated on an individual basis.		

C. **Construction Equipment Crossing Structures Which Have Attained 100 Percent of Anticipated Minimum Compressive Strength.** When a Contractor requests permission to cross structures, within the limits of the work, with vehicles exceeding the legal load limit, a design analysis of the structure and the proposed loading based on established criteria will be made by the Engineer. If found satisfactory, the crossings will be authorized subject to the following provisions:

1. **General Requirements.** These provisions apply to each case and will not be repeated in the authorization. The approaches to a structure shall be graded and maintained flush with the bridge deck for a minimum distance of 50 feet at each end of the structure.

   A temporary concrete or structural timber header shall be placed on the pavement seat at each end of the structure. A temporary concrete header shall be separated from the pavement seat by a wood divider approximately 1/4 inch, or by the use of two thicknesses of heavy building paper or 6 mil polyethylene. The temporary header and divider board shall be removed and disposed of by the Contractor at the time of paving.

   All equipment shall come to a complete stop before crossing a structure. Only one loaded vehicle will be permitted on any span of a structure at any one time. Unless otherwise specified, the maximum speed for travel of equipment over the structure shall be 5 miles per hour.

2. **Specific Requirements.** The following specific conditions under which the crossings are being permitted will be stated in the authorization:

   a. The material to be used to cover and protect joints from infiltration and damage;

   b. Axle weights loaded and unloaded;

   c. Spacing of axles;

   d. Spacing of wheels on each axle;

   e. Tire size; and

f. Estimated number of vehicle crossings to be made.

3. **Damage to the Structure.** The Contractor and the Engineer shall participate in inspections before hauling commences and after its completion to determine all damage to the structure incurred during the hauling period. All damage to the structure, including joints, that may be incurred as a result of the Contractor's hauling operations shall be repaired by the Contractor at the Contractor's expense.

4. **Violation of Requirements.** In the event of violation, the authorized permission will be immediately revoked. The authorization to haul across a structure according to these specifications or the subsequent withdrawal of such authorization will not be considered as the basis for additional compensation to the Contractor or for adjustment in the unit price for any item.

D. **Overloads Not Exceeding Legal Limits by 50 Percent On or Crossing Pavements.** Loads on concrete pavements, other than temporary concrete pavements, which do not exceed legal limits by 50 percent will be considered according to Table 104-2.

Table 104-3 Strength to be Attained Prior to Permitting a Load of 150 Percent of Legal Limit to be On or to Cross Pavements

Percent of Anticipated Minimum Compressive Strength			Flexural Strength All Mixes, psi	Maximum Load Permitted on New and Existing Pavements within Project Limits
5-1/2 Sack Mixes	6 Sack Mixes	7 Sack Mixes		
47	40	31	400	Finishing Equipment
76	65	50	550	Load within Legal Limits (For batch-hauling only)
82	70	54	600	Slip-form Pavers and Paving Mixers
88	75	58	600	Loads up to 25 percent over Legal Limits (For batch-hauling and shoulder operations only)
100	90	70	650	Occasional Loads up to 50 percent over Legal Limits (To complete construction activities)

Occasional loads exceeding legal limits by not more than 50 percent may be permitted on hot mix asphalt pavements after rolling is completed and the mat has cooled to ambient temperatures. Pavement edges shall be suitably protected and no deformation or marking of the pavement will be tolerated.

E. **Overloads Exceeding Legal Limits by 50 Percent On or Crossing Pavements.** The Contractor may be permitted to cross existing Portland cement concrete pavements with vehicles exceeding the legal load limit by 50 percent or more at designated locations approved by the Engineer under the following conditions:

1. The crossing area, 50 feet in width, shall be defined by saw cuts in the pavement and clearly marked by painted lines.

2. Traffic on the pavement shall be maintained by the Contractor during periods of hauling and reconstruction in a manner approved by the Engineer.

3. After hauling with overloads is completed, the pavement between the two saw cuts shall be removed and replaced with new pavement of the same type and equal in design characteristics to the original pavement.

   Where loads exceeding legal limits by 50 percent or more travel on or across bituminous pavements, the crossing area shall, when directed by the Engineer, either be removed and replaced or be resurfaced to the required surface tolerances.

   Where construction materials are furnished by the Contractor, restoration work shall be done at the Contractor's expense as consideration for the permission to haul with overloaded wheels or axles.

   Under circumstances where the haul route from a State-designated borrow area crosses existing roads, the removal and replacement of pavement when ordered by the Engineer, will be paid for at the contract unit price for applicable items in the contract.